DEPARTMENT OF STATE

Washington, D.C. 20520

**State Dept. review completed**

MEMORANDUM

STATINTL

TO: M/MO - [redacted]

FROM: A/OPR - Virginia Schafer

SUBJECT: PPG Tasking for Recommendations to Improve Use of the Department's Automated Information System

The Foreign Affairs Information System (previously referred to as Automated Document System) is a cornerstone for the Department's information future. It represents a modern, efficient capability for utilizing information assets and for managing resources demanded by the Department's foreign affairs information process - capabilities that few other agencies, outside of Defense and CIA, have available or under development.

One of the greatest values of this system is its potential use to offset human resources demanded by the Department's information process. This now totally manual process is the single most dominant and pervading of any in the Department. It consumes more time of more people than any other single function.

The system and its information provide a viable alternative to the present resource-consuming process of how information is used and maintained throughout the Department. As a viable alternative, appropriate application to derive its benefits is the critical objective. The Department must move to a new plateau in utilization of this valuable resource. It can reduce personnel burdens and concurrently sustain or increase the value of information by more effectively managing the information assets and resources involved.

The continual need for both additional financial and human resources demonstrates clearly one significant fact: All

personnel resources are equalized at the common denominator level of position staffing. A messenger or clerical position counts against the Department's position ceiling equally as that of a Special Assistant, an Assistant Secretary, or an Ambassador position.

The opportunity is available to make more effective use of the Department's scarce position resources by allocating them where the benefits will be greater. By application of modern information technology, routine duties can be performed more efficiently and with less demand on human resources. Significant portions of an individual's time or entire positions can then be made available for more important responsibilities and contributions. Freeing personnel time and positions from the mechanics of information handling is the objective of the Foreign Affairs Information System and its Central Foreign Policy File information resources.

At present, there are over 25,600 file cabinets in the Department and another 22,300 at posts. These files contain over 764 million pages of information materials. For a 5-year period, the Central Foreign Policy File contains approximately 11.8 million pages of unique information. In a single year, 1979, over 62 million copies were made for primary distribution of some 927,000 cables and airgrams. This redundancy demands a substantial amount of human effort in existing manually operated paper systems. It represents a waste of human resources that can be avoided. Even with this unharnessed paper explosion, information is still fragmented and combinations of important signals are often lacking, or worse still, are submerged by massive quantities of tangential information.

There is no efficient or effective solution that can cope with present proportions of proliferated information in paper copies. The only solution is to prevent this proliferation without diminishing the accessibility of information. The Foreign Affairs Information System can provide this solution.

To obtain maximum benefits from the system, an investment will be required. This investment will minimize demands for personnel by the paper handling process and allow the Department to make better utilization of scarce human resources and more effective use of information to support the Department's mission.

Briefly, recommendations for achieving these goals are:

1. Demonstrate desirability and benefits of the automated resource by saturating a geographic bureau with terminals at the country desk and working officer levels. Terminals, or preferably word processors, should be linked through the information system to the Department's communications

resources so that cables, memoranda and other papers can be sent, delivered, received, and retrieved at terminals. This will satisfy the requirement for convenience and provide a prototype for identifying problems and solutions in moving toward an efficient office of the future.

2. Convert airgrams to AIR CHANNEL cables and implement optical scanning of memoranda and other important papers. This will increase comprehensiveness of the central resource, increase accessibility and thus reliability as an authoritative source of information.

3. Improve capabilities of the user language which provides access to the information resource, and invest in research to develop automated indexing from words in message text. These features will make the system more efficient and more accessible in providing required information, and minimize the friction between the user and the system.

4. Provide the capability to identify papers to a case file and to reorganize and repackage search results to meet specific needs of users. This will increase responsiveness of the system and make it a more viable tool in meeting information needs of users.

A justification for these recommendations is presented in the attached analysis of impediments to maximum use of the system.

Attachment:
Constraints and Recommendations for Improving Use of the Foreign Affairs Information System and Reducing Demands for Human Resources.

# CONSTRAINTS AND RECOMMENDATIONS FOR IMPROVING USE OF THE FOREIGN AFFAIRS INFORMATION SYSTEM AND REDUCING DEMANDS FOR HUMAN RESOURCES

In response to the PPG Tasking for recommendations to improve use of the Foreign Affairs Information System, the following analysis demonstrates the viability of solutions for impediments to more effective use of the Department's information system.

There is a major constraint to using this electronic or digital medium as a surrogate for paper files. It can best be characterized as the lack of system "accessibility". Terminals accessing the system are not located where they are needed and there are not enough terminals to compete with paper files. And, because they are accessible, "personal" copies of papers in office or working files are difficult to compete with even though their upkeep, use and disposition are unnecessarily demanding of human resources.

The lack of terminals where they are needed, i.e. lack of convenience, is one of four factors that can inhibit or increase use of the system. The four key requirements of accessibility and use are:

- o Convenient - as nearby as a filing cabinet.
- o Comprehensive - complete in scope of relevant information.
- o Responsive - on request, provides the right information needed without missing pertinent information or without overburdening with irrelevant information.
- o Efficient - needed information can be found and used quickly and easily with a minimum of effort.

These requirements, and recommendations for meeting them are as follows:

1. CONVENIENT

The system must be as convenient as paper office files to compete effectively with and replace these files.

A. CONSTRAINT

The single greatest impediment to accessibility through convenience is security and its associated costs. A standard terminal for accessing the system costs between $2,000 and $4,000. It can be linked to the computer system with existing telephones in offices. However, since the system contains

classified information, special TEMPEST cleared (non-electromagnetic radiating) terminals must be used. This raises the cost of terminals by a factor of 3 to $10,000 or $12,000. In addition, secure conduit must be installed to link each terminal with the central computer system. Total price of an installed terminal is approximately $24,000.

At this price, relatively few terminals have been installed in the Department. Most are located adjacent to Assistant Secretaries' offices. However, a greater use of this facility can be made at the country desk and working officer levels where most of the paper files are located. To some extent, Assistant Secretaries do not need an information system - they already have one in the form of country desk and staff officers. The latter require an information system - one that is as convenient as present paper files.

B. SOLUTION ALTERNATIVES

A secure telephone network is the most viable solution to this constraint. Another possibility is the use of secure voice boxes to scramble or encrypt information over existing phone lines. This would allow any telephone in the building to be used with a terminal to access the system. A third possibility is the use of fiber optics, in lieu of shielded conduit, to link terminals with the system. A fourth, less desirable, possibility is to separate unclassified from classified information and allow low cost terminal and telephone access to unclassified material.

The latter alternative would produce a minimal benefit and thus, at best, a marginal solution. As put by one of the geographic bureaus, "It's the classified information that is of greatest interest and need. Access limited to unclassified information would be of minimum use." Fiber optics as an alternative would not substantially reduce costs over those presently incurred for shielded conduit. And there is still uncertainty as to whether or not fiber optics is vulnerable to penetration.

At $10,000 per unit, secure voice boxes do not presently offer a substantial reduction in cost. However, this alternative offers quick installation, and it is immune to the diminishing space required for installing conduit or fiber optics throughout the building. Lower cost versions of the secure box are supposed to be available in 1982. The secure telephone network is some years away, and does not offer an immediate or short range solution.

C. RECOMMENDATION

To prototype a "paperless", electronic office, one geographic bureau should be saturated at country desk level with terminals. Where possible, existing word processors should be used as terminals. This will avoid additional costs and proliferation of devices, each addressing a single facet of a multi-use information environment. These terminals, or word processors, will access the system to retrieve information from the central file. One objective is to replace as many bureau files as possible. However, equally as important an objective is linking terminals, through the computer system, with OC communications to allow for direct and paperless routing of cables for transmission, and for receipt of incoming cables. The same facilities can be used for delivery and receipt of memoranda.

The use of existing word processors as terminals and cost and installation options for secure linkage should be examined by ISO and OC.

Saturation of a bureau will provide a live working environment for identification of problems that must be resolved in moving toward an efficient office of the future. Paper will not be fully replaced as a means for delivering information. However, the retention of this information should be paperless.

2. COMPREHENSIVE

The automated central information resource can compete with, and become a viable replacement for, paper files if it is as complete and comprehensive as these office files.

A. CONSTRAINT

At present, the system is complete in its capture of cable and airgram traffic. However, it is lacking in important memoranda. This shortcoming is repeatedly demonstrated in response to Congressional oversight and FOI requests for information. It is highlighted by cases such as the Crown of St. Stephen, Moscow Radiation, and the recent Billy Carter-Libya Congressional inquiry. In all three instances, the preponderance of information resided in memoranda obtained from bureaus rather than from the Central Files. Answering requests, such as these, has imposed a search burden on bureaus, and has required more effort to identify and discard duplicates than the original overlapping effort required for searching.

Although bureaus are required to send copies of important memoranda and papers to FAIM for inclusion in the Central File, this policy and practice is not always observed. When they are sent in as paper media, they become microfilm records in the system, and the full text cannot be obtained on bureau terminals. Thus, there is no incentive for forwarding memoranda to FAIM for inclusion in the central resource.

To compete with paper files, these types of documents must be included in the central resource and they must be available in digital or electronic form.

Also related to comprehensiveness is the duration of time in which information is available from the system. When the system was originally implemented, full text of cables were to be kept on line for 3 years. However, demands for system storage space have caused cable text to be removed from the system after 18 months. After this time period, message text can be obtained only from microfilm. And microfilm recovery, as it is structured on reel film in this application, is extremely inefficient and demanding of human effort. For example, a comparison of retrieval from the system and retrieval from microfilm identified a 7:1 difference in time and effort needed to retrieve 35 cables. As the number of messages increases, the effort required for retrieval from microfilm reels increases at a disproportionate rate.

This human resource demand problem is more apparent in FAIM than in user bureaus. As an information service center, FAIM must frequently locate information dating back to the early 1960's. Microfilm, in this application, is only marginally more efficient than paper files.

B. SOLUTION ALTERNATIVES

There are two approaches available for obtaining information in memoranda and other paper media: (1) through word processors, or (2) through optical scanning of papers. Both will provide information in digital or electronic form.

The first alternative would require linking existing word processors with the system. These devices are used to prepare, create, and originate the documents in question. The system could automatically capture these information materials in electronic form directly from the source. However, as previously mentioned, the single impediment to this type of linked network is the cost of conduit or other secure linkage.

The second alternative would require that memoranda and other papers be prepared in a specified format, and in an optically recognizable typewriter font. Acquisition by the system would not be automatic as with direct capture from word processors. Originators would have to forward paper copies to FAIM where they would be optically scanned and input into the system. This would make information materials available to bureau terminals and provide an immediate incentive for bureaus to include them in the central information resource. A more comprehensive resource will provide greater accessibility to information.

C. RECOMMENDATION

FAIM is installing an optical scanner to capture these types of papers for the post information protection program. This program will provide properly organized microfiche copies of cables, airgrams (AIR CHANNEL cables), memoranda, and other essential documents to replace paper files at high risk posts. The scanner will also be used to capture similar information originated within the Department. A new memorandum form is currently being designed for testing this process.

With a more comprehensive central resource, the system will be more responsive and of more value to user needs. When an appropriate level of comprehensiveness is attained, bureaus will no longer be required to search office files in response to Congressional and FOI requests. At that point the Central File will have replaced the necessity for consulting office files.

In relation to comprehensiveness as it concerns availability over time, ISO is continuing its investigation of low cost, mass storage. Recent advancements in Very Large Scale Integrated (VLSI) circuit technology are drastically reducing costs and increasing storage capacities by orders of magnitude. VLSI chips, half the size of a domino, can store millions of characters of information. Low cost technology will soon offer storage for extended time periods, and thus increase comprehensiveness and accessibility in this domain.

3. EFFICIENT

Effort required to identify and find needed information must be minimized by an efficient, powerful user query language and a more flexible vocabulary of subject terms.

A. CONSTRAINT

One form of the system's inefficiency can be characterized as the experience and knowledge required of the user. This, however, is not a major deficiency or constraint of the system. Users must learn the query language as well as the thesaurus (controlled vocabulary of words) used for indexing subject content of communications and documents. The query language could be improved by providing simpler, multi-functional commands and by combining several related tasks into a single command. Although efficiency in the user language or commands is already acceptable, refinement would make usage more efficient and more desirable.

The system indexing vocabulary does require more user knowledge. There is no response from the system to key words or subject terminology that are not in the vocabulary. The correct terms must be used.

B. SOLUTION ALTERNATIVES

Changes and improvements in the user command language are already being defined by FAIM. However, only minimal changes can be made to the present system before such changes become a major system redesign effort.

As to the vocabulary, the use of automated indexing, to select nouns, qualifiers, and proper names from message text, will produce precision indexing and consequential efficiencies in retrieval. Automated indexing must be accompanied by synonym linkage since this method of indexing is prey to the vagaries of language occurring in message text. Combined automated indexing and synonym linkage would in essence provide free retrieval from free indexing. With any subject word entered by a user, all related words would be shown by the system to facilitate maximum recall of pertinent information. Retrieval of information will then be based on natural language.

A third alternative is the use of "private" indexing, i.e., indexing by originators and recipients of cables and memoranda. Present indexing by FAIM can be considered "public" in nature since it is performed for a broad range of users. Private indexing will supplement the information resource with the user's perspective of important subjects.

The goal of all of these forms of indexing is to make retrieval of needed information not only possible but relatively simple. The retrieval task must be made as natural to the user as possible. Simplicity and efficiency of retrieval are dependent on substantial organizing and indexing of information. However, easy and effective retrieval is illusive because language is dynamic -- words and their meanings change. Indexing finding aids must also be refined to keep pace with dynamics of the reporting language used by Foreign Service Officers.

C. RECOMMENDATION

FAIM currently is encouraging private indexing by users. It is being performed on a limited basis by the USUN and by some posts. To increase the value of the post microfiche program (to replace paper files), posts will be given instructions and will be encouraged to index messages they originate.

FAIM is also developing specifications for automated indexing and synonym linkage. To date, neither industry nor government has developed a system and methodology that performs satisfactorilly. The problem is not computer related. It is an intellectual

problem dealing with language, ambiguities in word relationships, and the ability to recover specific as well as conceptual level subject information. Additional financial resources will be required to bring the best expertise (consultants) to bear on this problem.

The system must deliver all of the right information when demanded, and it must present this information in an organized structure that facilitates its use.

A. CONSTRAINT

Responsiveness involves some of the principles of efficiency. The system must deliver all information relevant to a subject - not miss important information. It must also deliver the right information, and not overload the requester with tangential or irrelevant information. In this respect, indexing must be in-depth and of high quality. The better the quality of indexing, the less effort required to identify, find, and retrieve required information.

The present quality of indexing will provide an acceptable level of responsiveness. However, the FAIM staffing level is inadequate for the volume of communications that must be indexed on a timely basis. Information cannot be retrieved if messages have not been indexed, and as a consequence the resource suffers from lack of comprehensiveness. The value in being current and comprehensive has been weighed against the value of quality, in-depth indexing, i.e., not being able to find information versus the potential for finding it with increased effort. As a result, FAIM has opted for quick, shallow indexing to keep current. This surface indexing has diminished quality to the extent that broader, general searches are required to find specific information. Consequently the proportion of non-relevant to relevant information in a search response is greater than it should be. Solutions to this constraint are included with those to make system use more efficient.

Another more serious constraint to responsiveness is presented by the inability to restructure or sort retrieved information into a logical, usable order. This is serious where large quantities of information are retrieved for a single request. Examples are the People's Temple case (over 1,000 documents), Libya-Billy Carter case (over 2,500 documents), and special Tehran analysis (over 17,000 cables). In each of these cases, as well as numerous others, retrieved paper copies of cables had to be manually sorted in an order that would facilitate use and analysis. The effort required has been substantial - 2 to 4 people for up to 8 days depending on quantity.

This inability to sort and reorganize information also diminishes the potential for replacing office paper files. In L, for example, there are over 270 file cabinets. Portions of these files deal with extradition cases, and a sampling indicates that approximately 80 percent of their contents consists of cable traffic. These types of paper files would be ideal candidates for the central system. But the inability to organize documents by case, and then organize within a case, nullifies system potential for replacing paper files.

B. SOLUTION

Provide users with a capability to identify documents to a case file and to reorganize and repackage search results to meet specific needs.

C. RECOMMENDATION

Modify the present system to allow for user initiated sorting of key features identifying the characteristics of messages and their content. These key features should include date, originator, addressee, security classification, subject terms, personal names, TAGS, case or file number, etc. In conjunction with recommendations for improving the user query language and subject terminology for access, the need for a new system should be investigated. This need will be predicated on the ability to implement changes to the present system and the impact of these changes on the operational integrity of the system.

These recommendations should be accorded a main thrust effort with the best expertise available. Each recommendation will require financial investment and some marginal need of human resources for a short time period. The investment can benefit the Department by providing the basis to better manage the utilization of scarce human resources and more effectively use the Department's information assets.